Space Weather Forecast

Issued on Friday, 26 July 2024 at 01:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight Chance of G1/Minor Storms Days 1 and 2 (26-27 Jul). Chance of R1 Radio Blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity was Moderate in the last 24 hours, with an M1.3 flare observed at 25/1537UTC from a region now rotating off the west limb. There are currently eleven sunspot regions on the solar disc. The two closely residing spots in the southwest have continued a slow decay. The largest and most complex region is now approaching the south-centre disc and contains some magnetic complexity to its configuration. All other remaining regions are small or simple.

A partial halo was observed shortly after 25/0025 UTC on Coronagraph and Stereo imagery. While dimming was observed originating from AR3762 near the centre disc, the timing doesn't match (the halo appearing slightly before the dimming), which suggests that this CME is most likely far sided. The spectrometer onboard Solar Orbiter also recorded an estimated X7 at 24/2325 UTC, likely reinforcing the idea of a far-sided event. No Earth-directed CMEs have been observed in available imagery.

Solar Wind / Geomagnetic Activity:
The solar wind was at background levels initially, before the unexpected arrival of a Coronal Mass Ejection (CME) around 25/1330 UTC, leading to a sudden rise in solar wind speeds to slightly elevated levels, peaking near 470km/s at 25/1445 UTC. The total magnetic field was Moderate, but increased to become strong, peaking at 25/2100UTC, after the unexpected CME arrival. The all-important north-south component was weak initially, but increased to become moderate or strongly negative (southward) from 25/1330UTC as the CME arrived. The net result of the above solar wind measures on geomagnetic indices was mostly Quiet (Kp1-2) conditions, with Unsettled (Kp3) intervals observed 25/0900-1200UTC and 25/1800-2100 UTC.

Energetic Particles / Solar Radiation: Radiation levels have returned back to background levels after a period above S1 during 23 Jul following a large far sided full halo coronal mass ejection.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected, with a chance of further Moderate-class flares.

Solar Wind /Geomagnetic Activity: No coronal hole fast winds feature in the forecast period. An unexpected CME arrived at Earth on 25 Jul, although the source of this CME is currently unknown. The effects of this CME should begin to wane early on day 1 (26 Jul). Another CME may give Earth a glancing blow late on Day 1 or perhaps early on Day 2 (26/27 July), originating from a long period M2.4 flare close to the southeast limb on 23 Jul. Confidence is low though.

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Geomagnetic activity is expected to be mostly Quiet to Unsettled initially, with a slight chance of Active intervals early day 1 (Jul 26) due to the effects of the unexpected CME arrival on 25 Jul. Activity is likely to increase again late Day 1 (Jul 26) or early Day 2 (27 Jul) to become Unsettled or Active, with a Slight Chance of G1/Minor Storm due to possible glancing CME effects. Activity wanes on Day 3 (28 Jul) with conditions becoming mostly Quiet by Day 4 (29 Jul).

Energetic Particles / Solar Radiation: There is a slight chance of rising above the S1/Minor Storm threshold in response to any notable flares throughout the period.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	20	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	10	10
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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